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ABSTRACT

This document is the third in a series on instructional goals ED 074 032 and ED 056 994). The paper contains checklists for writers, teachers, and systems researchers on how to take apart and rebuild a goal to fit an instructional system. The first section contains: a) transparency masters to help explain this process to large groups; b) checklists to establish performance objective conditions; performances, and criteria; and c) information on taxonomy and systems. An addendum with pre- and posttests is also included. The second section presents information on a) writing performances and criteria; b) lecturing on performance objectives; and c) linking performance objectives and modules to fit educational systems. This section also includes an overview of the checklists. Graphs and charts are presented throughout the document. (BRB)

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C H E C K L I S T S

ON

HOW TO TAKE A GOAL APART

and

HOW TO PUT IT BACK TOGETHER AGAIN IN AN INSTRUCTIONAL SYSTEM

PO-1, entitled, HOW TO CLARIFY CLASSROOM INSTRUCTIONAL GOALS THROUGH PERFORMANCE OBJECTIVES, appears on microfiche ED 056-994.

PO-2, entitled, HOW TO INDIVIDUALIZE YOUR CLASSROOM INSTRUCTION BY USING PERFORMANCE OBJECTIVES, appears on microfiche ED 074-032.

PO-3, entitled, CHECKLISTS ON HOW TO TAKE A GOAL APART AND HOW TO PUT IT BACK TOGETHER AGAIN IN AN INSTRUCTIONAL SYSTEM, provides technical data necessary to implement PO-1 and PO-2.

SP 007 521

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WRITING When you have difficulty writing the CONDITIONS of your performance objectives, go to ---------- page 20

For help writing the PERFORMANCES and the CRITERIA, go to ---------- page 24

TEACHING When you are obliged to give a short INTRODUCTORY LECTURE on performance objectives, go to ---------- pages 3 to 6

You will find there a basic outline and introduction to the transparency masters included in this document.

SYSTEM BUILDING When you are confronted with an audience that the ADVANCED LECTURE on performance objectives, modules, and educational systems, go to ---------- pages 43 to 47

You will find there a perspective that will enable you to inform and coordinate the brain power in the group in front of you.

MEDIA CORRELATION When you are in a situation that requires you to work with educational technology, go to ---------- page 34

FOR A COMPLETE OVERVIEW OF THE CHECKLISTS, go to ---------- pages 37 to 39

WHAT TO DO WITH THIS MATERIAL

Look at page i -- DECIDE whether you want to (a) take a goal apart or (b) put it together as your main goal.

IF you choose (a), go immediately to page 5, the transparency masters there will give you a rapid overview.

IF you choose (b), go immediately to page 10 where you will learn how to use the attached checklists in a systematic fashion.

Look at page ii -- IF THE TABLE OF CONTENTS CONFUSES YOU, go immediately to page 48 and try one of the pretests. These short questions will give you some idea of what to expect.

IF YOU UNDERSTAND THE TABLE OF CONTENTS, you will realize that this book is a compendium of resources. Start with a section that interests you.

Look at page iii -- DECIDE whether your main interest is

WRITING

TEACHING

SYSTEM BUILDING

MEDIA CORRELATION

CURIOSITY

Then act accordingly. Start on the page indicated.

FOR A RAPID OVERVIEW, start reading on page 43.

AUDIENCES
WHO MAY
BENEFIT
FROM
THIS
MATERIAL

Most readers nowadays ask themselves, "Is this material written with me in mind?" The next question often is, "What's in this publication for me?"

AUDIENCE

1. ANYONE WHO WANTS TO START WRITING PERFORMANCE OBJECTIVES

BENEFITS

KNOWLEDGE

- Basic Vocabulary
- Basic Expressions
- Components of a Well Written Objective
- Taxonomy Fundamentals

SKILLS

- Pinpoint "Fuzzy" Words
- Substitute Precise Terms
- Teach So As to Stress Actions More than Words
- Tie Your Course Together So That Learners Consider It Relevant and Effective

ATTITUDES

- Better Writing Is Less Important Than Better Teaching and Learning
- Performance Objectives Stress a PROCESS More Than Writing
- If It's Worth Teaching, It's Worth Specifying and Detailing

AUDIENCE

BENEFITS

2. ANYONE WHO WANTS TO TEACH SOMEONE ELSE HOW TO WRITE PERFORMANCE OBJECTIVE

KNOWLEDGE

Assessing Learner Benchmarks
Typical Starting Places
Errors to Avoid
Simple Understandable Terminology

SKILLS

Let the Learner Get Used to the Idea
Stress Important Principles Rather Than Unnecessary Conventions
Use Transparencies Rather Than Needless Words
Start People Writing So They Can Learn by Experience Rather Than by Listening and Memorization

ATTITUDES

Writing Goals Is the LAST Step
Value Clarification Is More Important Than Cost Cutting
Teachers Must Change in the Classroom As Well As on Paper
"My job is to help him write clearly, it's not to tell him exactly what and exactly how to write!"

3. ANYONE WHO WANTS TO MAKE TEACHING AND LEARNING MORE SYSTEMATIC

KNOWLEDGE

"What am I trying to do?" (TARGETS)
UPWARD -- "Why?"
DOWNWARD -- "How?"

SKILLS

"How will I know when I've succeeded?" (TESTS)

ATTITUDES

"There are many ways to get there!" (TECHNOLOGY)

TRANSPARENCY MASTERS THAT CAN BE USED TO EXPLAIN THIS PROCESS TO A LARGE GROUP

With these transparency masters, you will be able to make a series of transparencies especially designed to illustrate the process of writing performance and behavioral objectives.

TRANSPARENCY TITLE	FUNCTION
A. WE GOAL BECAUSE....	Goal writing must not be considered as an activity divorced from what happens in the teacher's classroom. Goal writing (SETTING UP RELEVANT TARGETS) leads automatically into self-evaluation (DESIGNING APPROPRIATE TESTS).
B. OBJECTIVE INCLUDES ONE LEARNING OUTCOME....	When a teacher is forced to stress the most important outcome of his course, he tends to do a better job. Some good teachers are not very good at writing, but they are very expert at knowing what is important and what is secondary in their course.
C. FORMULA : OBJECTIVE EQUALS....	It is necessary to break the "course habit" to which many teachers are addicted. The remedy stresses performance rather than subject matter. Every performance has a context (WE CALL IT CONDITIONS) and standards of excellence (WE CALL THEM EVALUATIVE CRITERIA).

TRANSPARENCY TITLE	FUNCTION
D. EXAMPLES OF CONDITIONS	This transparency gives numerous examples of typical conditions to be found in performance objectives. The idea to stress here is that certain types of performance conditions can be grouped together into general categories, such as atmosphere, tools, team, and others. Such generalization has a larger payoff than mere itemization.
E. A FEW GUIDELINES	These guidelines should not be misinterpreted as rigid specifications. For example, the stress on PRODUCT in guideline 4, should in no way be mistranslated as an attempt to undermine the necessary "process" goals of a course. In such a case, "process" itself would be the desired product of instruction.
F. WORDS OPEN TO MANY INTERPRETATIONS	Teachers will tend to use these general words. For the teacher, each use of these terms has a very specific meaning. It is the job of the objective writer to "help" the teacher choose other words which get the message across to students, learners, and other educators.
G. WORDS OPEN TO FEWER INTERPRETATIONS	This list is merely illustrative of "action and visible verbs." There are hundreds of other verbs that can be legitimately used by teaching switching over to "observable goals." In any case, the choice of the "proper word" should be secondary to the choice of relevant and important objectives. When the goal is made clear, the choice of language will take care of itself.

TRANSPARENCY TITLE	FUNCTION
H. EXAMPLES OF EVALUATION CRITERIA	Both the learner and the teacher must be able to specify exactly what constitutes success. This process of self-evaluation should be rendered as clear, objective, and simple as possible. With the possibility of computerized correction, speed is also a possibility. In the area of psychomotor and affective skills, other evaluation instruments will round out the picture presented by paper and pencil type examinations.
I. AN EASY QUESTION	This question is presented to provoke introspection and various comparisons. It is intended to make the teacher and learner ask himself, "Is the technological level of instruction up to the minimum already in use in our homes?"
J. EACH ANSWER IS VISIBLE	This vast array of technology makes it clear how much our homes owe to the benefits of technology properly used. These pieces of hardware do the job faster, more economically, and perhaps better than the "old way."
K. A MORE DIFFICULT QUESTION	Now is the time for educators to inquire into the state of the art in instructional technology. The main idea is not merely to add machinery. The goal here is to recognize the necessity and advantages of man-material-machine systems in the world of education.

TRANSPARENCY TITLE	FUNCTION
L. GOAL INCLUDES....	The two terms, goal and objective, are similar in general signification. In very specific senses, goal is the more general term; objective is the more specific term. Goals tend to stress values and attitudes. Objectives tend to stress actions and visible activities. Our preference for **OBJECTIVES** is not to be interpreted as a bias against GOALS. It is simply due to the fact that objectives are more visible and more observable. Goals, valuable as they might be, are often quite difficult to measure.
M. OBJECTIVE EQUALS LEARNING PRODUCT	This is intended to stress the realistic idea that we observe goals through their manifestation in numerous objectives. We can't measure things such as patriotism directly. However, if we value it, we tend to rely heavily upon indirect observations : we measure outward signs of respect for the flag and government, we measure actions deemed appropriate, and we spell these out in objectives. The five activity types in the box represent only a few of the possible activities that can be tied in to invisible goals.
N. OBJECTIVE EQUALS BEHAVIOR OF STUDENT	Objective writing is student-centered. Instead of saying, "I will give a lecture on topic Y," the teacher is forced to say, "At the end of this course, my students who become learners will be able to do X, Y, and Z. At the beginning of the course, they were not able to perform these three activities!"

CHECKLISTS: Items Helpful to Pinpointing Performance Objective

- Conditions,
- Performances, and
- Criteria

The following checklists have been developed for two major audiences: teachers writing performance objectives and researchers trying to taxonomize the components within specific objectives. Teachers can find herein a list of questions they can ask themselves about their teaching goal before they start writing. Researchers can find herein an open-ended thesaurus useful to classify and cross-reference item and objective banks.

Checklists -- and Goals of Instruction

One of the easiest ways to kill off professional interest in the goals of instruction would be to reduce the role of the teacher to that of a functionary who checks off exactly what he wants to teach. The enthusiastic teacher thinks of his classroom objectives as much too unique to be adequately described by a brief list of items. The uninformed student will probably find the checklist approach rather dull and tedious as a first introduction to exciting subject matter.

These checklists were written with a definite philosophy of objective writing in mind. It can be approximated in three direct statements:

1 -- Teachers are the ones to decide what they want to teach in their classrooms.

2 -- Comparisons among and between teachers should be teacher-initiated.

3 -- Quality of written objectives is irrelevant as long as quality is maintained in classroom instruction.

Putting All This in Performance Terms

Choice -- Teachers should begin asking themselves a number of questions:

- What do I want my students to do?
- Why?
- Can it be measured?

This is not a process to be done in an ivory tower. It would seem appropriate to involve fellow teachers, the general public, graduates, and present students to insure a sufficiently broad sample.

The following checklists will give some indication of how to summarize the results of all this discussion and decision-making.

Comparisons -- The general public, school administrators, teachers, and students are interested in knowing exactly what is going on in the schools they support. The type of data required for all this is often contained in curricula outlines and in the academic recordkeeping systems developed to report student grades and achievement. Unfortunately, such data is not always precise enough to tell an individual teacher exactly what he could do to make his instruction more relevant, more interesting, and more efficient.

If such data were available to him in a form that could be revealed only at the discretion of the individual concerned, teachers would be in a better position to reorient goals and methods to attain desired instructional objectives.

Each of the items on the checklist is little more than an abbreviated notation of one or more variables on which a teacher can compare himself with others. The idea is to provide a comprehensive listing of things that can influence learning; after that, it is up to the individual teacher to do something about it in his classroom.

Quality Objective Writing -- It is the opinion of the author that most courses can be summed up in a list of ten or less objectives that will not fill up more than a page of double-spaced typing.

A good objective, like a good talk, takes a long time to write and refine. It is easy to give an hour talk without much retouching; to give a good five minute presentation takes several hours of retooling. It is the same thing with good objective writing.

The following checklists are an attempt to systematize the numerous decisions and issues that must be resolved before an objective is written with enough quality to make itself crystal clear to the non-specialist. This is not easy task; doing a lot of writing will not make it much easier. It is a question of decision and perspective: essentials must be distinguished from peripheral detail. It is hoped that these checklists will assist in this process.

we "GOAL" because

"If we don't know
where we are going,
how will we know
when we have arrived?"

HOW TO USE CHECKLISTS

Step One

Outlining the Course

Most teachers have course outlines. Sometimes, schools have developed course outlines in the form of topics to be covered. Some secondary schools have put out catalogs which give a brief resume of each section of a program. Teachers have often kept notes in unit size segments.

The first step is to simply write these down in rough form. For example, a teacher may write:

My Course Content

Unit One (Topic One, etc.)

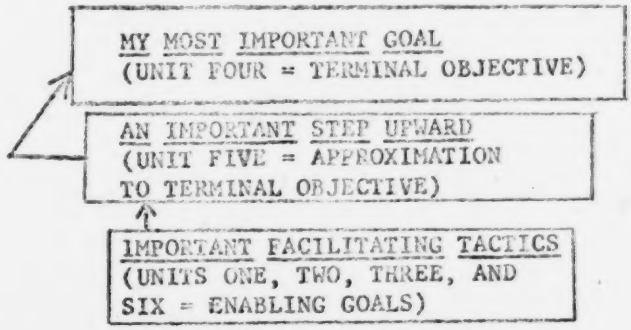
Unit Two

Unit Three

Unit Four****

Unit Five**

Unit Six


MY MOST IMPORTANT GOAL
(UNIT FOUR = TERMINAL OBJECTIVE)
AN IMPORTANT STEP UPWARD
(UNIT FIVE = APPROXIMATION
TO TERMINAL OBJECTIVE)
IMPORTANT FACILITATING TACTICS
(UNITS ONE, TWO, THREE, AND
SIX = ENABLING GOALS)

After putting down a brief description of course content, the teacher felt it necessary to place four asterisks after Unit Four because he considered it the most important part. As he continued to reflect on his teaching, he also decided that Unit Five was important although not as much as Unit Four, hence, the two asterisks. **(The diagram arrows will be explained later.)**

Step Two

Starting to Write

Most teachers have traditionally thought in terms of what they are going to do in teaching. They do not habitually think in terms of what their

students are going to do to learn. In other words, they assign the principal things to be done by a student to the tasks of listening in class, taking notes, studying the text, and preparing for exams. Most teachers admit that they want the student to learn the subject; they often do not think of specifying things the student should be able to do as a result of instruction in a particular unit. Because this is a new task, it is not always an easy one to begin.

Rather than try to write objectives for each unit or section or topic, it might be a good idea for the teacher to ask himself about the most practical advantage of the most important unit.

In the case in question, it might be good for the teacher to ask himself what is the activity which makes Unit Four so important in his mind. To make this more observable, it might be helpful for the teacher to think back on the most successful and on the most unsuccessful student he ever had as far as Unit Four was concerned. The teacher can center in on a number of things:

EXAMS
- How did both of these students do on the examination?
- Was there really very much difference between the two?
- Was the difference in knowledge, in attitude, or in performance?
- Was the difference due to ability or to learning achievement?

CLASS
- How did both of these students perform on a day-to-day basis in the classroom?
- Which listened best?
- Which asked the most, the best, the least, or the worst questions?
- Which followed directions most carefully or not at all?

With this information on "learner characteristics" and performance, the teacher is ready for the next set of questions on course objectives.

Step Three

Thinking It Out

The following questions must be answered by you to begin this process of objective specification :

- What is the most important activity in Unit Four? (TARGET)
- Why? (MOTIVATION)
- How can one know for certain that this most important objective has been attained? (TEST)
- What are the various alternatives open to you and to learners to attain this desired goal? (TECHNOLOGY)

After you have come up with these answers even in a tentative form, you are in possession of data that will make analysis of your goals, requirements, and resources worthwhile.

It isn't necessary to do this for every goal of your course. Doing it for only the most important objective is enough for a good start. After that, you will find yourself doing it only when it is worthwhile. In this context, worthwhile will mean more than "empty analysis" done to satisfy someone else. You will do it only because you believe it is worthwhile.

> You must answer these subjective questions your own way. You have no proof you're right. Later, you will be able to compare your decisions and judgments with those of your colleagues.
>
> This method will try (1) to help you carry out your freely chosen goals whatever they may be and (2) to make you aware of what your colleagues are doing. Any decision to change will still be up to you.

DEFINITION : What Is a Performance Objective ?

One of the key concepts taken for granted in the following pages is that of "performance objective" or "behavioral objective." This concept is often associated with such things as criterion-referenced objectives, built-in evaluation, terminal student performance, and performance-oriented objectives. For the purpose of this discussion, all of these terms are assumed to be practically synonymous even though each emphasizes a different aspect.

A performance objective is defined as a statement of an educational goal or objective in such a way as to clearly answer three questions about the teaching-learning-evaluation process :

- Exactly what will the successful student be expected to do?
- What materials and what procedures constitute an integral part of this student performance?
- How will one know when the student is performing this goal successfully?

Implications of This Definition

Performance objectives tell the student or trainee what it is that he or she will be expected to do when he is evaluated, the conditions under which he will have to perform, and the level, extent, or quality of performance expected.

To meet the standards herein spelled out, such an objective must be written in language that is clearly understandable by students, trainees, and the general public. Straightforward language works better than scholarly and obscure terminology as a vehicle with which to write objectives.

A well-written performance objective should do three things:

1st • It should clearly indicate what it is that a student who has mastered the objective will do or perform.

2nd • It should say under what conditions the student will be expected to do this.

3rd • It should say to what extent or degree of excellence the student will demonstrate his ability to perform.

The mere act of writing objectives will cause most teachers to come to grips with what they are trying to do in the classroom. This is a positive step towards relevant instruction. It also will give rise to an important question in making instruction more effective, "What materials and what procedures will best help the student attain objectives commonly agreed upon as relevant?"

This document will center on writing objectives and on working them into an integrated system. However, it must always be kept in mind that writing is the means to other goals, e.g. the development of goals meaningful both to student and to teachers and the evaluation of methodology in order to improve instruction, to name only two examples.

The Rationale Behind Performance Objectives

Performance objectives are statements which describe what successful students will be capable of doing at the conclusion of a particular learning unit.

- Properly written performance objectives leave no doubt as to what is expected of the trainee at the end of instruction.
- These objectives do not try to dictate to the teacher the methods to follow or the classroom procedures to employ in his teaching.
- However, they do eliminate haziness about what is to be accomplished.

There is nothing new or extraordinary here. Experienced teachers have been doing this even though they have not always put it down on paper. Writing goals encourages feedback from other teachers. When one starts exchanging professional ideas with colleagues, suggestions and improvements start to emerge in an atmosphere of enthusiasm. The following sections which spell out exactly what is meant by performance, conditions, and extent are intended to help teachers get started expressing, writing, and choosing their objectives.

Components of a Well-Written Objective

A well-written performance objective should spell out three things:

- the performance expected (an observable activity demonstrable by the learner)
- the conditions wherein the student will have an opportunity to demonstrate the newly acquired behavior or performance
- the extent or degree of the expected student performance which will serve as the evaluative criteria to assess the anticipated performance.

What Is Meant by "Performance"?

Performance can be equated with doing.

If performance is to be measured, it must be observable.

In other words, a statement of performance must specify an activity that can be observed directly.

Such verbs as "know, comprehend, and understand" specify activities that can only be inferred or seen indirectly. An objective is more clearly written when other more visible and more observable verbs are used:

- A teacher who says he wants his students to "understand" carburetors is less clear than a teacher who wants his trainees to be able to "clean" a carburetor.

- Similarly, the teacher who says he wants his students to learn how to "subtract" two digit numbers is more frank in the same circumstances than the teacher who claims for his goal "a deeper understanding" of mathematics.

Neither of these last two objectives is faultlessly written; the conditions and the extent of the desired student behavior are not spelled out, to name only two possible sources of improvement. However, the change from an abstract verb to a more specific verb has improved the visibility and observability of the intended instructional objective.

- It is much easier to recognize a student that can "read" voltmeters than a student who "understands" measuring instruments.

- A student who can "re-wire" a defective motor is more observable than a student who can "comprehend" the principles of electric motors.

Even the word "know" will have a different meaning to a teacher who relies upon "memory" questions and to a teacher who relies upon "brainstorming" techniques. It is helpful to the student if these differences are spelled out.

What Is Meant by "Conditions"?

Conditions refer to the circumstances in which the student is expected to perform.

Every situation will have its own given restrictions which can range from such obvious things as "paper and pencil" and "common tools" which need not always be stated to more complex measurement questions such as:

- Will this be an open or a closed book examination?

- Must the student work strictly from memory for formulas and data or will he be allowed to use reference tables?

- When the student identifies the resistors will he work from memory or with a color guide?

Each of these and similar questions about conditons are important since a change in the details of performance is often directly associated with a different type of cognitive functioning.

What Is Meant by "Extent"?

Extent refers to how well the student is expected to perform.

This can be expressed in a number of ways:

- minimum standards
- maximum number of permissible errors
- specification of time standards
- tolerance
- definition of correct or successful
- expected percentage of success
- minimal number
- degree of excellence

In other words, this is an attempt to make as specific as possible the evaluative criteria that will be used to assess the performance.

D I S P L A Y

An Analysis of Performance, Conditions, and Extent

Do - - - Expressing Objectives in Terms of Student Performance

Some school curriculum guides use words such as "understand, appreciate, know" to express their objectives.

From the point of view of behavioral objectives, the difficulty with these verbs is that the performance is not directly observable. These verbs do not tell what the student or trainee is supposed to be able to do as a result of this knowledge.

Conditions - - - Specifying the Exact Circumstances Under Which the Performance Is to Take Place

Obviously, each set of circumstances that one might develop will make its own specific demands upon the learner who attempts to accomplish the objective.

The idea is not to end up with several hundred specifications for every objective in each section of a course. The idea is to start specifying clearly the types of conditions under which the student will be evaluated. Once this approach enters a teacher's lesson plans, he will inevitably make his teaching both more concrete and more interesting because of its practical and operational orientation.

Extent - - - An Evaluative Measure of Acceptable Performance

Some of the more obvious approaches are time limits, error counts, percentage correct, minimum number, or accuracy. The emphasis is on the degree of excellence to be demonstrated by the student rather than on how the trainee acquired the ability to perform the skill.

OBJECTIVE

INCLUDES

1

LEARNING OUTCOME

- VISIBLE
- OBSERVABLE
- MEASURABLE

B.

FORMULA

OBJECTIVE

=

PERFORMANCE + CONDITION + EVALUATIVE CRITERIA

EXAMPLES OF CONDITIONS

ATMOSPHERE	TOOLS	TEAM
• in school	• open book	• alone
• on the job	• memory only	• in a group
• at home	• with slide rule	• in competition
• relaxed	• with tables	• with teacher
• under pressure	• with manual	• with supervisor

C O N D I T I O N S

When the student is expected to perform, the activity upon which he is evaluated will be mainly

_____ pencil and paper 1.0
_____ observable activity 2.0
_____ inferred from performance 3.0

His written activity will include

_____ multiple choice items 1.1
_____ matching items 1.2
_____ true-false items 1.3
_____ fill-in items 1.4
_____ written essay 1.5

His oral activity will include

_____ responding to questions 2.11
_____ oral description 2.12
_____ asking questions 2.13
_____ oral interview 2.14
_____ i interaction 2.15
_____ oral description 2.16
_____ group dynamics atmosphere 2.17

The criteria for correct responses will stress

_____ imaginative responses (divergent) 4.13
_____ specific responses (convergent) 4.11
_____ any model (generalized) 4.22
_____ a specific model (specific) 4.21

_____ responding alone 5.11
_____ as part of a group 5.12

_____ classroom atmosphere 5.21
_____ work atmosphere 5.22

_____ use of memory 4.51
_____ use of higher mental functions 4.52

Activities evaluated will be

_____ teacher-initiated 5.23
_____ student-initiated 5.24
_____ group-initiated 5.25

While responding, the student will have access to

_____ diagrams, charts 5.34
_____ text (open book) 5.33
_____ portions of text 5.32
_____ no text 5.31

_____ reference tables (log, constants, color code, manuals) 5.42
_____ no references permitted 5.41

_____ access to formulate plans 5.52
_____ memorized data 5.51

_____ raw materials 5.64
_____ any tools and equipment 5.63
_____ only specific tools 5.62
_____ access to supplies and parts 5.65
_____ no tools 5.61

For mathematical computations, the student will have access to

_____ paper and pencil only 5.71
_____ mental calculations only 5.72
_____ slide rule 5.73
_____ calculator 5.74
_____ computer 5.75
_____ math tables 5.76

His physical activity will stress

_____ brute force 2.81
_____ minimum skill 2.82
_____ average skill 2.83
_____ complex skill 2.84
_____ dexterity and finesse 2.85

The student may perform for credit

_____ only at specified times 6.11
_____ only after instruction 6.12
_____ during instruction 6.13
_____ before instruction 6.14
_____ whenever ready 6.15

A FEW GUIDELINES

1 — Use Verbs

2 — Subdivide Goals into Performances

3 — Stress Learner Performance

4 — Stress Product

5 — Visualize Activities, not Subject Matter

6 — Pinpoint One Outcome .

7 — Spell Out Conditions

8 — Specify Standards and Criteria

WORDS OPEN TO MANY INTERPRETATIONS

To know

To understand

To really understand

To appreciate

To fully appreciate

To grasp the significance of

To enjoy

To believe

To have faith in

WORDS OPEN TO FEWER INTERPRETATIONS

To write

To recite

To identify

To differentiate

To solve

To construct

To list

To compare

To contrast

PERFORMANCE

When the student performs the performance to be evaluated, he will

_____ speak 2.10
_____ discuss it 2.18
_____ do it 2.20
_____ emote it 3.10
_____ write it 1.60

The performance desired can best be classified as

_____ a short term goal 6.51
_____ a long term goal 6.54
_____ an intermediate goal 6.52
_____ an entry level employment goal 6.53
_____ a personal development goal 6.55

The target population for this objective is any student in:

_____ the school system 3.51
_____ the occupational specialty 3.52
_____ other occupational programs 3.53
_____ a specific course 3.54
_____ a particular section of a specific course 3.55
_____ private study 3.56
_____ all of the above 3.57

Students whose ability ranking is

_____ above-average 3.61
_____ average 3.62
_____ below average 3.63

Students whose achievement ranking is

_____ above-average 3.66
_____ average 3.67
_____ below average 3.68

Students classified as

_____ handicapped 3.71
_____ disadvantaged 3.72
_____ potential dropout 3.73
_____ discipline problems 3.74
_____ exceptional 3.75
_____ attendance problems 3.76

CRITERIA

The basic criteria will stress

_____ time standards 4.31
_____ execution of standard procedure 4.32
_____ time and accuracy standards 4.33
_____ cost standards 4.34

_____ predetermined criteria 4.12
_____ serendipity expected 4.14

_____ teacher criteria 4.61
_____ student criteria 4.62
_____ independent judge criteria 4.63

_____ absolute scale 4.71
_____ relative scale 4.72

The numerical aspects of this criteria will stress the following measurements:

_____ right or wrong standard 7.11
_____ maximum permissible errors 7.12

_____ scale of excellence 7.20

_____ ranked 7.21
_____ degrees of excellence 7.22

_____ production minimum number 7.30

_____ count 7.31
_____ percentage of success 7.32

_____ physically measurable 7.40

_____ tolerance 7.41
_____ standard deviation 7.42

This test item is basically

_____ a pre-test 4.91
_____ a post-test 4.92
_____ a diagnostic test 4.93
_____ an aptitude test 4.94
_____ an achievement test 4.95

EXAMPLES OF EVALUATIVE CRITERIA

	QUANTITY	QUALITY	
GOOD			MASTERY
FAIR			APPROX-IMATION
POOR			BEGINNING

FEEDBACK : Translating This Definition into a System That Permits Teachers to Look over the Shoulders of One Another

Writing objectives in concrete and clear language has been going on for a long time in occupational and vocational education. There has never been any shortage of paperwork documentation in this area.

Too much effort is required to turn out good performance objectives if they are simply going to sit around on a library shelf somewhere. What is proposed here is a method whereby teachers can find out what is being taught in classes similar to to their own. In this way, they will be able to improve their classroom instruction through awareness of what others are doing. This is the heart of any feedback system.

Objectives Evolve Once They Are Written

The question arises, "How does the average teacher with many time-consuming obligations develop his objectives?"

The following section is not meant to give a theoretical model of how to develop performance objectives in the framework of a feedback system. It is meant to tell the story of six teachers who tried to develop a course in auto mechanics. The idea came to them in the course of a one day training session on how to write performance objectives. Most of their feedback was accomplished by exchanging photocopies of their objectives with each other through the mail. These six teachers did not make use of computerized classification and feedback systems. However, the same principles apply to their primitive collaboration as would apply to more sophisticated computerized systems mentioned in later sections.

What These Teachers Wanted to Happen

It would be hard to pinpoint the exact motivation of each teacher. A look at their comments might give some idea of what they wanted:

- "I want to find out how other teachers break this course down into instructional blocks."
- "I want to find out what teachers in a similar type community and school situation are doing."
- "I am not satisfied with my own programs and I want to find out what others have found to work."

In a few brief words, each of these teachers was looking for feedback. The idea of writing objectives was simply a means to get there. The format of performance objectives adds the dimension of precision to this necessary teamwork.

Step One--The Tally Sheet

The first thing these teachers did was to exchange information about course titles and major subdivisions. This soon made it obvious that local situations were a little bit different: each teacher took individual approaches to the same course.

In order to find common territory, each teacher wrote down the major blocks that mapped out the work from September to June. For most teachers, this represented about ten to fifteen major subdivisions within his course.

After this was done, it became evident that there were major terminology variations. A little bit of explanation made it clear that there was about sixty per cent commonality in what was taught by each teacher. Commonality meant that several teachers had similar names and similar content for their blocks. The other course objectives were addressed to local needs and were not always covered by a majority of the six.

It was interesting to note that each teacher had his own particular way of breaking down the subject matter:

- Teacher A relied upon task analysis and job requirements.
- Teacher B tended to have a large number of separate blocks which were centered around each part of the engine and transmission.
- Teacher C seemed to think in terms of marketable skills.
- Teacher D thought in terms of job families and related skills.
- Teacher E felt that students should be exposed to theory first and machinery later on.
- Teacher F didn't give too much thought to course sequence since he preferred to rely on typical production demands as cars came in to be repaired.

Step Two--Awareness of Local Needs

The teachers found out that one way rigid programs failed to meet varying local conditions was by attempting to set up the same curriculum blocks for all schools and by ignoring the necessary adaptations to meet varying local requirements.

At first, three or four of the teachers thought it would be a good idea to have all students exposed to exactly the same instructional goals and nothing else. They thought this would give a sound statistical basis to their work. When the topic of individualization came up, such a monolithic approach was seen to be humanistically unworkable.

Up to this time, local decision making had been on a very perfunctory level. It usually consisted of a number of gimmicks in order to get the largest budget possible. When seen from the viewpoint of six different schools, it often happened that large amounts of money were spent separately by each school to develop identical or at least very similar programs. This was both time-consuming and very expensive; its result was needless duplication for those objectives which were taught by several schools. The same work was done over and over again without being shared with other schools.

The teachers came up with a solution. It was a decision to share common course goals. Goals not common to several schools would not be abandoned or overlooked. The unique adaptations would be based upon educational benefits as the criterion rather than merely cost-accounting.

If a goal or an objective was found necessary to meet local needs, its expensive development price tag would not be considered the reason to postpone its implementation. The economies made in exchanging common core objectives between similar programs would free local funds to focus on meeting local needs.

Step Three--Writing the Objectives

Once the course had been broken down into blocks, it was found helpful to ask this question. "What are the two or three most important objectives of this particular block of instruction?" rather than "Have all the possible objectives for this particular block been listed?"

The reasons for this are obvious:

- Concentrating on a few objectives enabled the teacher to stress educational values rather than paperwork.

- Teachers would then be able to think in terms of the big picture rather than in day-by-day or minute-by-minute miniaturized ideas.

- Feedback will almost be certain to occur. When one teacher saw only one or two principal objectives of another teacher, he began to notice that he himself had chosen another aspect as more important. Since the other teacher was also experienced, he began to ask himself quite seriously who had made the better choice.

- Rather than worry about doing all this writing himself, the typical teacher found out that he was able to share his own ideas and to borrow those of others.

- The emphasis was on selecting the most effective objectives, no matter who had written them. This placed each teacher in the right frame of mind to begin improving his own performance.

- One of the difficulties of the modern communications gap is having too much information. A hundred objectives would have been too much for these six teachers to handle at one time. Two or three objectives every two weeks from each teacher was found to be quite manageable.

Step Four - Bouncing Objectives Around - This is a process that requires the ability to give and take. Sometimes, the teacher defended his own objectives; other times, he acknowledged that his colleague had really done a better job.

Teacher A wrote, "Given a malfunctioning valve, the student will be able to repair it in five minutes or less."

Teacher B wrote,

"CONDITIONS: Given an automobile, reference manual, fender covers, tachometer, and screwdriver,

PERFORMANCE: The trainee will adjust the idle to factory specifications and normalize the engine,

EXTENT: Within ± 25 RPM and demonstrating all safety rules."

Teacher C wrote, "My students will be able to get a part-time job Saturdays after school earning about $2.00 an hour after three months of instruction; they should be able to earn about $3.50 an hour after another three months for a B grade. Those who make more or less will get A's or C's."

Teacher D wrote, "Once the student has demonstrated the ability to do a grease job, he must be able to give snappy service which impresses the customer with his promptness, speed, accuracy, and interest in doing a good job."

Teacher E wrote, "Every student is to be able to tell, in terms of physics or mechanics, exactly why he turns a screw or makes an adjustment. It is not enough to merely do the right repair; the student must always be able to think and to tell why; this proves he has thought."

Teacher F wrote, "The student must realize that after every repair job, the car must be cleaned and given the appearance of being fresh off the assembly line even if this means washing it after an oil change."

Step Five - The Interaction - Without realizing it, each teacher had some insights and some blind spots. In the exchange of objectives via the U.S. Mail, each teacher came to acknowledge a bit more of his expertise and also his limits. Each had something to teach, but also something to learn from the others.

Teacher A - Quality and Time -

Teacher A jumped on the objectives of teachers C, D, and E for lacking any conception of quality and time.

He did admit that his objectives needed more life to make them more interesting to the life style and hazy career goals of his students.

Teacher B - Format and Analysis

Teacher B was congratulated by the group for having devised a format which emphasized the three essential elements of a properly written objective. In general, most of the six teachers approved of the simplicity and clarity introduced by his approach.

Further study of his objectives revealed a few errors that could be easily corrected by proper editing :

- "to factory specifications" should be in the EXTENT and not in the PERFORMANCE section
- "and normalize the engine" should be a separate objective and not tied on to the adjustment of the idle.

This last suggestion was not accepted by all. Some felt it should be an integral part of the idle adjustment while others felt that, for learning purposes, the two should be separate.

As the objective was further analyzed, some felt that safety rules were common to all operations and should be made into separate objectives that could provide the introductory classes in all occupational areas.

Teacher C - Relationship Between Education, Skill, and Income

It was quite obvious that teacher C did not have much trouble motivating his students and trainees. He himself tried to oversimplify his approach which placed quite a bit of emphasis on getting a job employing the skills learned.

The source of student motivation was not so much money as the growing insight teacher C developed in his students that school can improve skills. Their own practical work experience showed them that skills combined with knowledge of on-the-job opportunities can help a person advance up a career ladder

In retrospect, teacher C did admit that he actually used other bases for his grades and report cards than student salaries. He also felt that in this area he had been helped by the free exchange of objective criteria now easily available from the other teachers.

Teacher D - Affective Domain

Most of the other teachers had taken attitudes for granted. It had been assumed that the student would naturally pick up these necessary components of successful functioning in a job.

Teacher D did admit that he needed objectives in the cognitive and psychomotor domains. Until now he had never had a readily available source of them. Rather than have to write all of them himself, he was quite happy to profit from the work of the group.

Similarly, the group was quite interested in the various ways he had accumulated a vast array of practical ways to instill punctuality, cooperative work habits, teamwork, safety consciousness, acceptable appearance, honesty, trustworthiness, care of tools and equipment, compatability with fellow workers and supervisors, responsibility, industriousness, and record-keeping.

Teacher E--Cognitive Domain

Most of the other teachers were impressed by the vast scientific background of E. He had built up a collection of workable slides and models which the other teachers wanted to borrow to use in their explanation of the scientific principles underlying the everyday auto repair skills.

One university and one publishing company approached E and asked him to set up a common core for all occupational students in physics and to write an illustrated text stressing skill and understanding.

Teacher F--Customer Satisfaction, Job Families, and on-the-job Training

The explanation made by F that students really need little more from a course in auto mechanics than the ability to learn on the job was not accepted at all.

However, his concept of job families was seen as an inevitable outcome of the fact that most humans do want a bit of change after polishing a skill to the point that it can become merely a dull routine from which repetition has removed its first glamor.

an easy QUESTION:

How many electric appliances do you have?

EACH ANSWER IS VISIBLE:

DINING–KITCHEN JOBS

- Refrigerator
- Range
- Freezer
- Dishwasher
- Disposal Unit
- Exhaust Fan
- Toaster
- Coffee Maker
- Food Mixer
- Portable Mixer
- Blender
- Rotisserie
- Automatic Skillet
- Deep Fryer
- Automatic Sauce Pan
- Egg Cooker
- Waffle Maker
- Grill
- Ice Cream Freezer
- Juicer
- Bottle Warmer
- Knife Sharpener
- Refrigerator-Freezer

ENTERTAINMENT and BETTER LIVING

- Television
- Radio
- Clock-Radio
- Phonograph
- Tape Recorder
- Projector
- Electrical Toys
- Elec. Hobby Equipment
- Wall & Ceiling Lamps
- Floor Lamps
- Table Lamps
- Electric Clocks
- Electric Bed Coverings
- Shaver
- Hair Dryer
- Heating Pad
- Heat Lamp
- Sun Lamp
- Vibrator
- Vaporizer
- Night Light
- Electric Intercom

SERVICE JOBS

- Clothes Washer
- Clothes Dryer
- Sewing Machine
- Hand Iron
- Water Heater
- Vacuum Cleaner
- Waxer-Polisher
- Power Tools
- Garage Door Opener
- Electric Lawn Mower
- Air Conditioners
- Attic Fan
- Other Fans
- Space Heaters
- Furnace Motor
- Electric Sprayer
- Heat Pump
- Doorbell
- Other

A MORE DIFFICULT QUESTION:

How Much INSTRUCTIONAL TECHNOLOGY . . .

DO YOU EMPLOY?

M E D I A

The teacher activity to be employed to attain the desired student activity will stress:

_____	talking	2.10	
_____	reading from textbook	2.19	
_____	audio-visual media	2.20	
_____	demonstrating	2.21	
_____	imitation	2.22	
_____	creativity	2.30	
_____	serendipity	2.31	
_____	thinking out loud	2.32	
_____	answering questions	2.33	
_____	asking questions	2.34	
_____	unplanned creativity	2.35	
_____	master teaching	2.40	
_____	dynamic oral presentations	2.41	
_____	review of fundamentals	2.42	
_____	presentation of bibliography	2.43	
_____	distributing written notes and texts	2.44	
_____	giving directions	2.45	
_____	giving of assignments	2.46	
_____	correction of assignments	2.47	
_____	team teaching	2.50	
_____	teamwork with class	2.51	
_____	dramatization	2.52	
_____	planting ideas	2.53	
_____	availability for consultation	2.54	
_____	presentation of challenges	2.55	
_____	problem solving	2.60	
_____	simulation	2.61	
_____	case study	2.62	
_____	psychodynamic interaction	2.70	
_____	group awareness process	2.71	
_____	student personality probing	2.72	
_____	career planning with students	2.73	
_____	motivation	2.74	
_____	propagandizing	2.75	
_____	orientation	2.76	
_____	solicitation of student goals	2.77	
_____	alignment of goals	2.78	

T A X O N O M Y: A File Cabinet or A Source of Educational Ideas?

The development of this preliminary taxonomy was quite simple. Several thousand teacher-written performance objectives were screened to find common elements of conditions, performance, and criteria. These were then arranged to determine the exact testing conditions that would be used to evaluate the success of each particular objective. The next step was to sample teacher-chosen methods employed to attain these classroom goals.

This naturally explains the first sections of these checklists: conditions, performance, criteria, and media. As reference numbers were assigned to each item to provide a unique identifier, several major categories merged:

0.0 Taxonomy Variables
1.0 Written Activity
2.0 Other Observable Activity
3.0 Inferred Activity
4.0 Criteria Standards
5.0 Atmosphere
6.0 Academic Recordkeeping
7.0 Numerical Data

Section 0.0 acknowledges the current emphasis on taxonomy classifications based upon cognitive, affective and psychomotor distinctions necessary to a systems approach. Such systems are not always linked to observable criteria.

Section 1.0 acknowledges current test and measurement theory and practice which has dealt at great length with paper and pencil examinations.

Section 2.0 is written in such a way as to melt away the distinction often made between teacher-activity and student activity.

Section 3.0 is intended to develop the vast yet unexplored domain of learning outcomes to be inferred from performance.

Section 4.0 tries to answer a very difficult question in criteria standards, "How will one know when success has been achieved by the learner (and teacher)?"

Section 5.0 on the atmosphere of teaching-learning evaluating delves into a number of questions that teachers often leave unanswered even though they are very much on the minds of students; e.g. "Can we use our books?" or "Do we have to memorize formulas?"

Section 6.0 does not accept current timetables and examination dates as the only way to keep track of student achievement.

Section 7.0 tries to spell out the meaning of a wide variety of numerical data which can be used to keep track of student achievement in conventional terms or in more performance-oriented terms.

This taxonomy has been left open-ended for a very simple reason. There are always to be expected local adaptations that do not fit into neatly preconceived pigeon-holes. If provision is not made for expansion, it is conceivable that the error of Procrustean logic will be repeated over and over again as curricula are stretched out or lopped off to fit the system instead of adjusting the system of classification to fit the curriculum.

It is also hoped that the gradual blurring of the distinction between teaching and learning will not result in a lessening of the professional aspect of the teacher's role. Section 2.0 which spells out the various observable activities of teachers (sections 2.20 to 2.70) has been purposely left in terms that could apply equally well to both teacher and student alike. Section 1.0 acknowledges that often the role of the studnet has been reduced to that of someone who must listen to the teacher and then write back what he has learned.

Section 2.0 is proposed in terms that will give many teachers the idea that students can and ought to participate in such things as audio-visual preparation and utilization, creativity, master teaching, team teaching, problem solving, and psychodynamic interaction. Thus, according to the classification system herein proposed, a situation wherein two teachers both take turns acting as master teachers is not classified as team teaching. Team teaching is reserved to the cases wherein a real term relationship exists among the teachers and learners and evaluaters; on a real team, not everyone has the same role, but all do work together in a spirit of comradeship and equality, not equality of knowledge or skill but equality of purpose and of common goals.

WHAT CAN BE DONE with All These Numbers and Categories

It is not to be expected that every teacher in every course will have to pinpoint all the exact categories in the above taxonomy which precisely describes his goals. However, it is hoped that the typical teacher will be able to go through it asking such questions as these:

- Does this section refer to my classroom objectives?
- Does this section offer something that I could use to make my instruction more relevant, more interesting, more efficient, more learnable, and more measurable?
- Does this classification reveal that the dominant activity in my classroom is mine, my student's, or a balanced blend of both?
- Does a profile of my teaching goals, of my students' learning, of my teaching methods, of my evaluation tools, and of my records reveal a broad spectrum of variety or a narrow and limited sampling band?
- Do I know what other teachers of the same subject matter are doing in situations similar to my own?

This is a sample of the type of question hoped to be aroused by this classification. If questions such as "Why so much paperwork?" or "Is all this cross-reference necessary?" are the only ones to arise, then these checklists need to go back to the drawing board for refurbishing.

Accountability to Oneself as a Professional

This paper has tried to make the goals of the typical classroom teacher more observable. Once a goal is presented inobservable terms, it is easier to measure it. Measurements naturally leads to evaluation and judgments. One of the major judgments in education is summed up in the word, "accountability."

Accountability means that the teacher is responsible to someone for the type of performance he attains in the classroom. A teacher is responsible to himself: he must use his specialized knowledge in the manner he deems most appropriate to the learning of his students. A teacher is responsible to his students: he must teach them in such a way that the results of his teaching do make a difference in the observable behavior of his students. A teacher is responsible to education: he must be funded by and operate under the parameters demanded by the public trust confided to him by society.

It is hoped that the objectives clarified through use of this checklist will be visible, observable, and measurable nature. If this is done, the professional teacher will be able to make any self-initiated changes in his teaching necessitated by the audiences to which he is accountable.

NUMERICAL ORDER

For increased reference, these codes can be listed in numerical sequence.

0.0 - Taxonomy Variables

1.0 - Pencil and Paper (Written Activity)

- 1.1 - multiple choice items
- 1.2 - matching items
- 1.3 - true-false items
- 1.4 - fill-in items
- 1.5 - written essay
- 1.6 - write it
- 1.7 - type it

2.0 - Observable Activity

- 2.10 - oral activity (talking)
  - 2.11 - responding to questions
  - 2.12 - oral description
  - 2.13 - asking questions
  - 2.14 - oral interview
  - 2.15 - oral interaction
  - 2.16 - oral description
  - 2.17 - group dynamics atmosphere
- 2.20 - audio-visual media
  - 2.21 - demonstrating
  - 2.22 - imitation
- 2.30 - creativity
  - 2.31 - serendipity
  - 2.32 - thinking out loud
  - 2.33 - answering questions
  - 2.34 - asking questions
  - 2.35 - unplanned creativity
- 2.40 - master teaching
  - 2.41 - dynamic oral presentations
  - 2.42 - review of fundamentals
  - 2.43 - presentation of bibliography
  - 2.44 - distributing written notes and texts
  - 2.45 - giving directions
  - 2.46 - giving of assignments
  - 2.47 - corrections of assignments
- 2.50 - team teaching
  - 2.51 - teamwork with class
  - 2.52 - dramatization
  - 2.53 - planting ideas
  - 2.54 - availability for consultation
  - 2.55 - presentation of challenges
- 2.60 - problem solving
  - 2.61 - simulation
  - 2.62 - case study
- 2.70 - psychodynamic interaction
  - 2.71 - group awareness process
  - 2.72 - student personality probing
  - 2.73 - career planning with students
  - 2.74 - motivation
  - 2.75 - propagandizing
  - 2.76 - orientation
  - 2.77 - solicitation of student goals
  - 2.78 - alignment of goals
- 2.80 - psychomotor activity
  - 2.81 - brute force
  - 2.82 - minimum skill
  - 2.83 - average skill
  - 2.84 - complex skill
  - 2.85 - dexterity and finesse

.0 - Inferred from Performance

3.10 - emote it

3.50 - student program (any student from ...)

- 3.51 - the school system
- 3.52 - the occupational specialty
- 3.53 - other occupational programs
- 3.54 - a specific course
- 3.55 - a particular section of a specific course
- 3.56 - private study
- 3.57 - all of the above

3.60 - student ability and achievement

- 3.61 - above-average
- 3.62 - average
- 3.63 - below-average
- 3.66 - above-average
- 3.67 - average
- 3.68 - below-average

3.70 - student types

- 3.71 - handicapped
- 3.72 - disadvantaged
- 3.73 - potential dropout
- 3.74 - discipline problems
- 3.75 - exceptional
- 3.76 - attendance problems

4.0 - Criteria Standards

4.10 - creativity and originality

- 4.11 - specific responses
- 4.12 - predetermined criteria
- 4.13 - imaginative responses
- 4.14 - serendipity expected

4.20 - generalizing

- 4.21 - a specific model
- 4.22 - any model

4.30 - time and quality

- 4.31 - time standards
- 4.32 - execution of standard procedure
- 4.33 - time and accuracy standards
- 4.34 - cost standards

4.40 - source of criteria

4.50 - mental functions

- 4.51 - use of memory
- 4.52 - use of higher mental functions

4.60 - execution of criteria

- 4.61 - teacher criteria
- 4.62 - student criteria
- 4.63 - independent judge criteria

4.70 - scaling of criteria

- 4.71 - absolute scale
- 4.72 - relative scale

4.90 - type of test item

- 4.91 - a pre-test
- 4.92 - a post-test
- 4.93 - a diagnostic test
- 4.94 - an aptitude test
- 4.95 - an achievement test

5.0 - Atmosphere

- 5.10 - who and how many
  - 5.11 - responding alone
  - 5.12 - as part of a group
- 5.20 - where and how
  - 5.21 - classroom atmosphere
  - 5.22 - work atmosphere
  - 5.23 - teacher-initiated
  - 5.24 - student-initiated
  - 5.25 - group-initiated
- 5.30 - texts
  - 5.31 - no text
  - 5.32 - portions of text
  - 5.33 - text (open book)
  - 5.34 - diagrams, charts
- 5.40 - reference materials
  - 5.41 - no references permitted
  - 5.42 - reference tables (log, constants, color code, manuals)
- 5.50 - planning
  - 5.51 - memorized data
  - 5.52 - access to formulate plans
- 5.60 - tools
  - 5.61 - no tools
  - 5.62 - only specific tools
  - 5.63 - any tools and equipment
  - 5.64 - raw materials
  - 5.65 - access to supplies and parts
- 5.70 - mathematical computations
  - 5.71 - paper and pencil only
  - 5.72 - mental calculations only
  - 5.73 - slide rule
  - 5.74 - calculator
  - 5.75 - computer
  - 5.76 - math tables

6.0 - Academic Recordkeeping

- 6.10 - dates of promotion and exams
  - 6.11 - only at specified times
  - 6.12 - only after instruction
  - 6.13 - during instruction
  - 6.14 - before instruction
  - 6.15 - whenever ready
- 6.20 - conversion variables
  - 6.51 - a short term goal
  - 6.52 - an intermediate goal
  - 6.53 - an entry level employment goal
  - 6.54 - a long term goal
  - 6.55 - a personal development goal

7.0 - Numerical Data

- 7.10 - accuracy
  - 7.11 - right or wrong standard
  - 7.12 - maximum permissible errors
- 7.20 - scale and excellence
  - 7.21 ranked
  - 7.22 degrees of excellence
- 7.30 - production minimum number
  - 7.31 - count
  - 7.32 - percentage of success
- 7.40 - physically measurable
  - 7.41 - tolerance
  - 7.42 - standard deviation

GOAL INCLUDES

PERFORMANCE OBJECTIVE #1

PERFORMANCE OBJECTIVE #2

PERFORMANCE OBJECTIVE #3

GOAL =
OFTEN VAGUE TERMS

e.g. KNOW
UNDERSTAND
APPRECIATE
LEARN
VALUE

PERFORMANCE OBJECTIVE =
STUDENT ACTIVITY

P.O. = VISIBLE PROGRESS

P.O. = OBSERVABLE LEARNING

P.O. = MEASURABLE BEHAVIOR

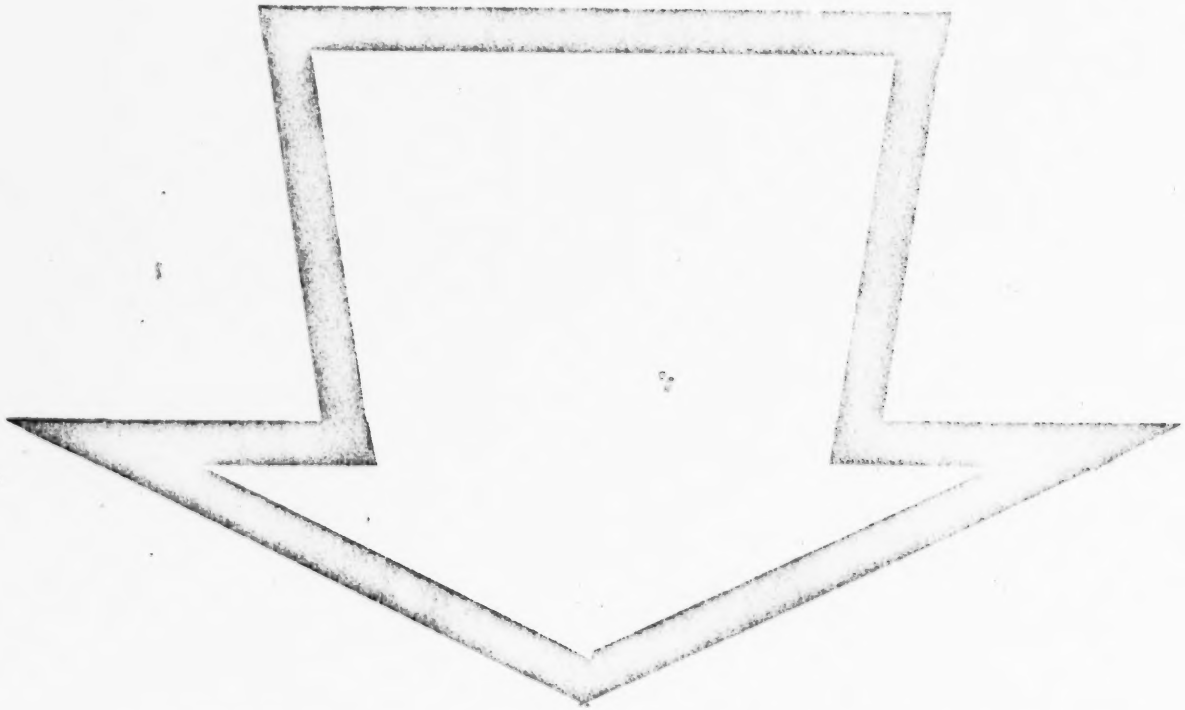
OBJECTIVE

=

LEARNING PRODUCT

e.g. : IDENTIFY — NAME — DESCRIBE — ORDER — CONSTRUCT

OBJECTIVE



BEHAVIOR OF STUDENT

TYING ALL THIS TOGETHER IN AN INSTRUCTIONAL SYSTEM

1. THE SEMANTIC HANG-UP

Educators commonly specify four levels of objectives:

TO	TERMINAL OBJECTIVE
ATO	APPROXIMATIONS TO TERMINAL OBJECTIVE
EO	ENABLING OBJECTIVE
CO	CLASSROOM OBJECTIVE

Depending upon the theoretical nicety deemed appropriate, a lot of time can be lost trying to tie down each of these terms and others to appropriate definitions. A similar amount of time can be spent distinguishing between "behavioral" and "performance" objectives. This is not our purpose here. We want to tie all this material together into a system that links together and that works together. LINKAGE refers to compatability of basic components. WORKING TOGETHER means that the sum effect of all parts is that of a system that produces a greater result than merely adding individual efforts. A system is able to do things that a merely random collection cannot do.

2. THE PYRAMID OF OBJECTIVES

This hierarchy places TO in the highest place. Each TO is composed of several ATOs. Each ATO is composed of several EOs. Each EO is composed of several COs. It is conceivable that the analysis may find that each CO is composed of several LAs. LA is the abbreviation for Learning Activity.

The point about the learning pyramid is that it may be built in several different ways and combinations. There is no one way to the top. Each learner and each teacher will have developed individual approaches and paths which are found to have been effective.

3. THE TREE OF OBJECTIVES

For reasons of abstraction, we often refer to learning as going from Point A (WHERE THE LEARNER IS) to Point B (WHERE THE TEACHER IS). This analogy is correct as far as it goes. It doesn't account for the cases wherein both learner and teacher arrive at Point B simultaneously. It doesn't account for the cases wherein the learner goes on to Point C (EXCELLENCE BEYOND THAT OF THE TEACHER OR COURSE GOALS).

This gives some idea of why the concept of a pyramid and a two point approach is inadequate as a model to describe human learning. Since a human learner is always growing, rather than merely traveling from one place to another, he is more properly compared to a growing tree. Not every possible combination of TO, ATO, EO, and CO is realized, but they do grow together and

work together. The person who has learned something whether it be TO, ATO, EO, or CO has done more than acquire additional baggage and has acquired more than a trip from A to B. The human learned who has learned something is able to learn more and better.

The condition of this learning is to start with the learner as he is. One then takes the next step, whatever that may be. This will vary from learner to learner.

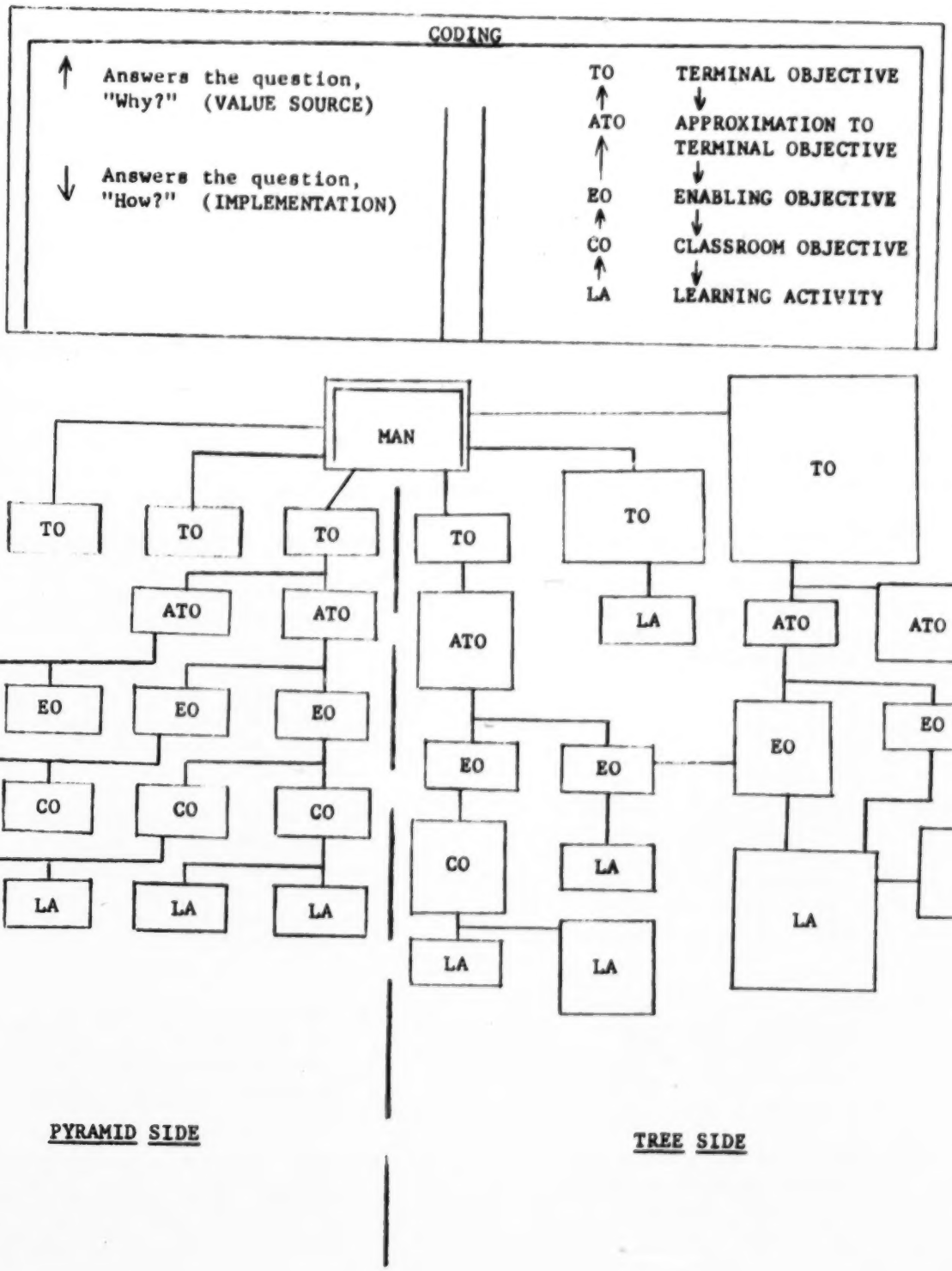
The PYRAMID of learning may be the same for all. The TREE of learning will be quite individualized.

4. A COMPARISON

The display, THE PYRAMID VS. THE TREE, will make this clear.

The PYRAMID is SYSTEMATIC.	The TREE is SURVIVAL ORIENTED.
Each level is made up of the lower levels in perfect harmony and symmetry.	Each level just seemed to grow in its own way and size. Sometimes, a few levels are missing. Yet, there is no need to go back and add them just for form's sake.
The PYRAMID is demonstrative of EQUAL GROWTH in each interchangeable component part. Each part could easily be attached elsewhere.	The TREE is demonstrative of NON-SYMMETRICAL GROWTH in each of its systems. A few of the higher levels are blown all out of proportion.
The PYRAMID seems to stress DISTINCT FUNCTIONS and separate responsibilities for each component part.	The TREE points out the INTERACTION of many parts. Certain sections that seem quite distinct somehow happened to GROW TOGETHER.
The PYRAMID is an example of HUMAN LOGIC seeking the right way to do things.	The TREE is an example of HUMAN HISTORY that tells how things happened to get the way they are. There are many other possibilities.

THE PYRAMID VS. THE TREE



5. A SYSTEMATIC PERSPECTIVE

The previous section should not be misread as an eulogy of the TREE.

This would mistakenly lead to overlooking the advantages of the PYRAMID.

Human applications of the TREE structure develop in response to urgent needs for immediate SERVICES.	Human applications of the PYRAMID structure develop in response to the leisurely consideration of the OBJECTIVE question : "What do we want to do?" Objective is equated with GOAL.
Humans are often TOO BUSY doing their job of rendering service to have much time for planning and logical analysis.	Systems experts take the time to QUESTION THE CONSEQUENCES of what is being done and how it is being done.
Such humans are HARD WORKING individuals providing needed services. They WANT TO be effective in their work.	Systems experts MAKE IT EVIDENT that APPROPRIATE GOALS and EFFECTIVE WORK HABITS characterize all they do.
Every human LEARNS BY EXPERIENCE.	Systems analysts try to LEARN FROM THE EXPERIENCES OF OTHERS.
People try to DO A BETTER JOB.	Systems designers try to DREAM UP VIABLE ALTERNATIVES to anticipate what might change if things were done differently and more efficiently.
The man on the street tends to PLAY IT BY EAR.	Systems planners try to make predictions based upon HARD DATA. Hard data is another term for evidence visible to the average person.
Everyone FEELS that what he does "makes a difference" in the lives he touches.	Systems evaluators try to PROVE and QUANTIFY exactly how much of an impact is really visible.

Do you have any aggressive learners?

This short booklet has presented a few ideas on performance objectives and how to tie them together into modules and into other educational units. Its intent is to make you the reader realize that whatever you do in the analysis of your course goals is important if you use it to improve the way you perform in the classroom and to improve the way your students learn in the classroom and in a variety of other ways.

In other words, we have tried to stress a process that goes beyond merely writing out everything one wishes to teach. Ask the non PRO about what he teaches, and he will probably respond with something FUZZY, UNMEASURABLE, and GLITTERING WITH GENERALITY. He may say, "I want to make my students intelligent, patriotic, and reasonable." "I want to do my part in improving the world of education."

Ask the PRO, and he will give you a list of specifics. "My students will pass my examinations. They will get jobs paying at least $3.75 per hour. They will do a lot of things I never told them about. They will be able to repair malfunction X in 15 minutes with no errors." These last examples are not perfect. They do show that a PRO never sets an objective that he can't measure. He may win or he may lose, but he will be able to know the difference.

The PRO has learned the hard way that his main use of performance objectives is not in writing out what he wants to teach. He uses them to get his students thinking and specifying what they want to learn. After a while, he gets them to write their own course objectives. This is his way to build "aggressive learners" who (a) know what they want, (b) know how to measure their partial and complete successes, and (c) have a variety of paths and price tags with which to get there. Aggressive learners have specific (a) targets, (b) tests, and (c) technology.

PRETEST No. 2

Pretest on Writing Performance Objectives

YES NO 1. The only way to write curriculum is through the use of performance objectives?

YES NO 2. Performance objectives stress interior and invisible learning progress made by the learner.

YES NO 3. Performance objectives **should** be evaluated only by expert evaluators. They cannot be self-evaluated by individual learners.

YES NO 4. The precise nature of a particular performance objective can be best understood when it is studied in connection with the evaluation item used to measure it.

YES NO 5. The subject matter aspect of a specific performance objective should be edited and evaluated by a computer retrieval expert.

YES NO 6. The printed format of a particular performance objective placed into a computerized retrieval bank should be edited by someone knowledgable in the subject matter area.

YES NO 7. It is not possible to make the changeover to performance objectives on a limited and experimental basis. One must **either accept** the entire system or reject the entire system. It is not practical to begin the system in small testable portions.

YES NO 8. After one has decided to develop a performance objective system, it is best to start writing performance objectives immediately. After a while, the coding, classifying, and retrieval of performance objectives will take care of themselves.

YES NO 9. Performance objectives are placed into a bank in much the same way you would place them in a safe deposit box. When they are in the bank, they are protected from theft by other people interested in plagarizing your objectives. In the bank, they will remain safe and protected from people who would otherwise infringe upon your copyrighted property.

YES NO 10. If you want to start training teachers how to write performance objectives, you must assume that all the teachers with whom you will come in contact know absolutely nothing about this process.

YES NO 11. Teachers who being to use performance objectives to improve their classroom performance must realize that performance objectives necessitate a complete change in the way they teach. This means a complete revamping of teaching style and classroom tactics.

YES NO 12. Performance objectives tend inevitably to dehumanize education since they are prespecified rather than left to serendipity or chance. Teachers should not be forced under any circumstances to prespecify their classroom objectives.

Writing as the Last Step

Step 1 - Become student-centered! Think of what the learner will do. Shift gears from thinking about what you the teacher will do. (What you do is part of the related technology).

Step 2 - Become so objective that another person knowledgable in your field could test your students for exactly what you want them to learn to do. Incorporating someone else's viewpoint is one step toward making your evaluation more objective. These tests developed by others will steer you clear from the temptation of teaching to a narrow sampling of test items.

Step 3 - Start doing something that makes an impact on your students. Activate them to do something. Don't leave them just sitting there. This skillful application of the right stimuli to the prospective learner at the proper time constitutes the heart of educational technology.

Step 4 - Start writing. Critique what you write. You will be surprised at how much you can learn and unlearn. You may overstress knowledge or performance at first, but, after a while, you will learn the importance of attitude.

POSTTEST No. 2

Definition Objectives

If one of your primary objectives is to have students learn a specific definition, be careful. Unknowingly, you may be overstressing memorization. For example, rather than insist on a recitation of the law of levels, you could come up with a practical problem that would permit the learner to apply the law of levers.

1. There are many ways to find out if a student has learned something new.

2. Not everyone with a facile and retentive memory can translate memorized data into appropriate activity. This is not the same thing as rotely memorizing what to do.

3. The non-verbalizer who can perform activities that sum up a course has acquired many cognitive skills even though he talks or writes about them. He has learned to think things through.

Awareness of definitions is important, but it is more important that learners learn to tie things together into meaningful activities.

A teacher who cross-examines his course will come up with things he never thought of before. He will also find that some of the things he teaches are unnecessary and should be removed. Once he realizes that he is teaching too much in too little time, he will be able to set priorities and start with learnable goals.

POSTTEST No. 3

Affective Areas

Some areas are explicitly psychomotor. If a learner does everything the way his surreying instructor tells him, he will succeed with a predictable accuracy.

Other areas are more open to differences of opinion. If a learner does everything his speech teaches him about persuasive presentations, he may or may not succeed in convincing his audience.

Attitude objectives are intended to give teachers and learners a sense of direction. They are not meant to limit one's possibilities. Sometimes, an attitude objective will aim specifically at producing unpredictable but relevant results. Once a specific target is agreed upon, teachers and learners are free to come up with a variety of unique learning paths leading thereto and with a full array of highly individualized learning styles.

Student attitudes and interests will shape the content of a course even when there is an almost inflexible course outline. Remember, three years from now, today's learners will say either, "We got what we needed!" or "We were ill-prepared!" Don't wait till the students become alumni to give them a chance to carry the ball.

Specific course objectives don't imply regimentation. Performance objectives parallel minimum criteria for success. Getting along with co-workers is even more necessary than theory and skill.

FOR MORE INFORMATION, send a stamped, self-addressed envelope to

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